EXHIBIT 6

Nutrition and Metabolic Insights

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FREEDOM TO RESEARCH

ORIGINAL RESEARCH

Biochemical and Anthropometric Effects of a Weight Loss Dietary Supplement in Healthy Men and Women

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Abstract

Background: We have recently noted an acute increase in circulating free fatty acids and glycerol, as well as resting metabolic rate, when men and women ingested the dietary supplement OxyELITE Pro™ in a single dose. We have also noted a reduction in appetite when subjects were treated with this supplement for 14 consecutive days. It is possible that such findings may favor body weight and fat loss over time. Therefore, the purpose of the present study was to determine the effects of this dietary supplement on weight loss and associated markers using an eight week intervention.

Methods: Exercise-trained subjects were randomly assigned in double blind manner to ingest either the dietary supplement (n = 16; aged 22.8 ± 0.7) or a placebo (n = 16; 22.5 ± 0.5) every day for eight weeks. Body weight, body composition, skinfold thickness, serum lipids, and appetite were measured as the primary outcome variables. As measures of supplement safety, a complete blood count and comprehensive metabolic panel were performed, and resting heart rate and blood pressure were measured (pre and post intervention).

Results: No interactions or main effects were noted for our primary outcome measures ($P > 0.05$). However, when comparing pre and post intervention values for the supplement, significant decreases were noted in appetite, body weight, body fat percentage, and skinfold thickness ($P < 0.05$), while increases were noted for total and HDL-C, as well as for resting heart rate ($P < 0.05$). No changes were noted for placebo from pre to post intervention ($P > 0.05$), with the exception of an increase in HDL-C ($P < 0.05$). Blood pressure and bloodborne safety variables were not differently impacted by supplement or placebo ($P > 0.05$), with the exception of monocytes, for which an interaction effect was noted ($P = 0.04$).

Conclusion: These data indicate that the dietary supplement OxyELITE Pro™ may assist in weight and body fat loss in a sample of exercise-trained men and women. The supplement does not result in any adverse effects pertaining to resting blood pressure or blood-borne markers of safety; however a small increase in resting heart rate is observed.

Keywords: supplement, adiposity, body fat, lipids

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Background

The prevalence of obesity and overweight status has increased to epidemic proportions within recent years, with approximately 400 million individuals classified as obese,[1,2] and 1.6 billion classified as overweight.[2] While the ideal treatment plan for this problem includes increased physical activity[3–5] and modification and restriction of dietary intake,[6] additional options exist. These include the use of pharmaceuticals[7] and/or surgical intervention,[8] as well as the use of dietary supplements.[9]

With regards to the latter, dietary supplements continue to increase in popularity, with 80 percent of adults purchasing dietary supplements at least once per year,[10] with an estimated worth of $61 billion to the United States economy in 2008. One class of supplement that appears in high demand is designed to aid in body weight and fat loss.[11] These products have the potential not only to aid in reducing body weight and fat, but also to improve the serum lipid panel.

We have recently studied the effects of the weight loss dietary supplement OxyELITE Pro™, using both an acute laboratory study focused on metabolic rate and blood markers of lipolysis,[12] as well as a 14 day intervention study focused on appetite suppression and clinical safety markers (eg, complete blood count, metabolic panel, lipid panel).[13] Both of these studies involved young and healthy subjects. The supplement has been noted to result in an increase in circulating free fatty acids and glycerol, in addition to an increase in resting metabolic rate (when delivered as a single dose). A slight reduction in appetite has also been observed. No adverse effects have been noted with regards to clinical safety markers (eg, blood chemistry). Despite these findings, no scientific evidence is currently available pertaining to the effects of this dietary supplement following a longer term intervention period. This is true with regards to anthropometric and safety data, as well as other bloodborne variables of interest associated with obesity such as serum lipids and markers of oxidative stress (eg, malondialdehyde). Therefore, the purpose of the present study was to determine the effects of OxyELITE Pro™ on weight loss and associated markers following an eight week intervention, using a randomized, placebo controlled, double blind design. We hypothesized that subjects in the supplement group would experience more favorable changes in weight loss and associated parameters compared to subjects in the placebo group.

Methods and Procedures

Subjects

Thirty-two recreationally exercise-trained men or women (5.2 ± 0.3 hours per week of exercise; 3.9 ± 0.5 years of exercise) between the ages of 19 and 36 years participated. The indicated sample of 32 subjects is similar to many other studies involving weight loss dietary supplements. Our inclusion of men and women of younger age was done in an attempt to mimic the subject population which represents the market for weight loss dietary supplements. Traditionally, weight loss studies include only young to middle aged obese subjects, typically women who are inactive. One unique aspect of our study is the inclusion of an equal number of men and women, all who exercise regularly, and most who are not obese. Such a sample has greater generalizability to the target market for weight loss supplements. Subjects were nonsmokers and did not have any cardiovascular or metabolic problems that might affect their response to treatment and their ability to participate. Health history, drug and dietary supplement usage, and physical activity questionnaires were completed by all subjects to determine eligibility.

Concerning human subjects, each was informed of all procedures, potential risks, and benefits associated with the study through both verbal and written form prior to participation. This was done in accordance with the Declaration of Helsinki and the procedures approved by the University Institutional Review Board for Human Subjects Research (H11-24). All subjects signed an informed consent form prior be being admitted.

Screening

During the initial visit to the laboratory, subjects completed the informed consent form, health and physical activity questionnaires. Subjects were provided with food logs and instructions regarding how to complete these logs during the week prior to beginning their assigned condition and during the final week of the assigned condition (please see description below). Subjects received a detailed schedule for the entire study period outlining all pertinent dates of participation.

Testing

For both visits to the laboratory (pre and post intervention), subjects reported in the morning hours (5:00–11:00 am) following a 10 hour overnight fast. Upon arrival, food records were collected and reviewed with subjects. Subjects were then asked to void. Subjects then sat in a chair and rested for 10 minutes. Heart rate (via 60 second palpation of the radial artery) and blood pressure (via auscultation using a two-earpiece stethoscope) was then measured and recorded. A blood sample was then obtained (described below). Subjects were then asked to record their overall appetite during the prior two weeks, using a 10 point visual analog where the scale was anchored with "0 = none at all and 10 = extreme." Following this, subjects' height, weight, waist and hip circumference, skinfold thickness (7 site using a Lange caliper), and body composition was measured. Body composition was determined by dual energy x-ray absorptiometry (DEXA; Hologic QDR-4500W) using a 6-minute fan array. Both total and regional (trunk specific) body fat were determined, and fat and fat free mass were calculated. The DEXA assessment was performed by a licensed technician. These exact procedures were followed for both test days (pre and post intervention).

Blood collection and biochemistry

Blood was collected from subjects on two different days throughout the course of the study: pre intervention (day 1 of the study—the morning of the first day of supplement or placebo use) and post intervention (the day following the final day of supplementation). On each occasion, venous blood samples (~25 mL) were taken from subjects via needle and Vacutainer®. All blood samples were collected in a fasted and 10 minute rested state. Following collection, samples were processed and immediately placed in the refrigerator or the freezer, depending on the sample. A portion of blood samples were sent to Laboratory Corporation of America for analysis of lipid panel, complete blood count, and comprehensive metabolic panel. The lipid panel was determined using enzymatic procedures (Roche/Hitachi Modular). The complete blood count was determined using an automated cell counter (Coulter LH750). The comprehensive metabolic panel was determined using automated procedures (Roche/Hitachi Modular). Remaining blood was stored at −70 °C until analyzed for malondialdehyde, following the procedures of Jentzsch et al,[14] using reagents purchased from Northwest Life Science Specialties (Vancouver, WA).

Supplementation

Subjects were randomly assigned (via coin flip by an investigator not involved in data collection) in double blind manner to consume either a placebo (n = 16; 8 men and 8 women) or the supplement (OxyELITE Pro™; USPlabs, LLC, Dallas, TX; n = 16; 8 men and 8 women). None of the investigators involved in this work have a financial interest in USPlabs, LLC. The supplement contained a proprietary blend of caffeine, bauhinia purpurea, bacopa monniera, geranium stem extract (1,3 dimethlyamlamine), cirsium oligophyllum, and rauwolscine extract as the active ingredients. Capsules were produced in accordance with Good Manufacturing Practices and from the same lot number. The placebo (microcrystalline cellulose) and OxyELITE Pro™ capsules were identical in appearance and were dispensed to subjects in identically labeled bottles, at the start of the study and after four weeks. Neither the subjects nor the investigators involved in data collection were aware of the assigned treatment.

Subjects were instructed to use the supplement or placebo in the same manner as suggested on the product label. Specifically, subjects were instructed to "Ingest 1 capsule daily for the first three days. If the single capsule each day is well-tolerated, then, starting on day four, try ingesting an additional capsule, 5–6 hours after the first capsule. If this is well-tolerated, then this will be your dosage throughout the eight week study period. If, however, taking the second capsule causes any adverse effects such as sleeplessness, then you should attempt to ingest 2 capsules at once in the morning, provided that it is well-tolerated. If ingesting 2 capsules at once in the morning is not well-tolerated, then you should revert back to 1 capsule daily in the morning." Therefore, subjects were provided the option to use either 1 or 2 capsules per day. This was done in an attempt to duplicate the conditions in which individuals would use this dietary supplement in a non-laboratory based setting. Subjects reported their intake to investigators (when capsule bottles were returned) and compliance to treatment was determined by counting remaining capsules. For both conditions, capsules were taken with water on an

empty stomach in the early morning, and if taking a second dosage, during the early-mid afternoon.

Dietary records and physical activity

Subjects were instructed to maintain their normal diet (inclusive of food and beverages) during the eight week study period and to record intake during the week prior to each test day. Diet records were analyzed for total kilocalories, protein, carbohydrate, fat, and a variety of other nutrients (Food Processor SQL, version 9.9, ESHA Research, Salem, OR). Subjects were asked to maintain their normal physical activity habits and exercise training schedule during the study period, with the exception of the two days (48 hours) prior to each test day, in which they were asked not to perform any strenuous exercise. Subjects were not required to maintain activity logs.

Statistical analysis

Outcome measures were analyzed using a 2 (condition) × 2 (pre/post intervention) analysis of variance (ANOVA). The primary outcome measures were also analyzed using a paired *t*-test (comparing pre and post intervention data independently for both supplement and placebo). The data are presented as mean ± SEM. All analyses were performed using JMP statistical software (version 4.0.3, SAS Institute, Cary, NC). Statistical significance was set at $P \leq 0.05$.

Results

Subject compliance to treatment, appetite, descriptive characteristics, anthropometric and hemodynamic data are presented in Table 1. All subjects assigned to the placebo ingested two capsules per day. Of the 16 subjects assigned to the supplement, 11 ingested two capsules per day and five ingested only one capsule per day. These five subjects indicated that the ingestion of two capsules was associated with increased feelings of jitters and sleeplessness. None of the remaining 11 subjects assigned to the supplement noted any adverse effects of treatment. Due to scheduling conflicts, four subjects (three using supplement;

Table 1. Descriptive characteristics, anthropometric and hemodynamic data for 32 men and women assigned to OxyELITE Pro™ or placebo for eight weeks.

Variable	OxyELITE Pro™			Placebo		
	Pre (n = 16)	Post (n = 16)	*P* value**	Pre (n = 16)	Post (n = 16)	*P* value**
Compliance to treatment (%)	NA	93.0 ± 1.2	NA	NA	94.6 ± 1.9	NA
Age (years)	22.8 ± 1.0	NA	NA	22.5 ± 0.7	NA	NA
Height (cm)	172.9 ± 2.6	NA	NA	170.3 ± 1.3	NA	NA
Body weight (kg)	78.0 ± 4.1	76.1 ± 3.9	<0.01	75.2 ± 2.4	74.6 ± 2.5	0.15
BMI ($kg \cdot m^{-2}$)	26.0 ± 1.2	25.4 ± 1.1	<0.01	25.9 ± 0.7	25.7 ± 0.7	0.14
Waist (cm)	83.8 ± 3.7	81.2 ± 3.3	<0.01	81.2 ± 2.0	80.5 ± 2.2	0.14
Hip (cm)	103.4 ± 2.0	102.3 ± 1.6	0.10	101.8 ± 1.4	101.7 ± 1.4	0.96
Waist:Hip	0.81 ± 0.02	0.79 ± 0.02	<0.01	0.80 ± 0.02	0.79 ± 0.02	0.14
DEXA total body fat (%)	24.1 ± 2.1	23.1 ± 2.0	0.02	25.1 ± 2.3	25.0 ± 2.3	0.87
DEXA trunk body fat (%)	22.6 ± 2.4	21.8 ± 2.3	0.09	24.3 ± 2.2	24.0 ± 2.2	0.57
Total fat mass (kg)	18.5 ± 1.7	17.3 ± 1.6	<0.01	18.7 ± 1.8	18.5 ± 1.8	0.51
Total fat free mass (kg)	59.5 ± 3.8	58.8 ± 3.7	0.03	56.5 ± 2.7	56.1 ± 2.7	0.14
Skinfold thickness (mm)	147.3 ± 16.2	130.4 ± 14.9	<0.01	144.8 ± 15.4	138.0 ± 14.8	0.06
Heart rate (bpm)	63.3 ± 1.9	69.4 ± 2.2	<0.01	65.1 ± 2.1	66.9 ± 2.9	0.35
Systolic blood pressure (mmHg)	114.1 ± 3.2	117.2 ± 3.5	0.35	112.3 ± 2.3	111.8 ± 2.6	0.97
Diastolic blood pressure (mmHg)	70.1 ± 3.2	72.9 ± 2.1	0.29	70.7 ± 2.6	70.0 ± 2.6	0.88

Notes: Values are mean ± SEM. No condition × Pre/Post intervention interaction effects noted ($P > 0.05$). No condition effects noted ($P > 0.05$). No pre/post intervention effects noted ($P > 0.05$). ***P* values obtained using paired *t*-tests for each condition.

one using placebo) had their post intervention DEXA scan performed one day prior to the end of the 8 week intervention (after 55 days of treatment).

As can be viewed in Table 1, compliance to both the placebo and the supplement was excellent and not different between conditions ($P = 0.49$). No interactions or main effects were noted for any anthropometric or hemodynamic variable ($P > 0.05$). However, when comparing pre and post intervention values for the supplement, significant decreases were noted in body weight, BMI, waist circumference, waist:hip, total body fat percentage, fat mass, fat free mass, and skinfold thickness ($P < 0.05$), while an increase was noted in resting heart rate ($P < 0.01$). No changes were noted for placebo from pre to post intervention ($P > 0.05$).

Lipid panel and malondialdehyde data are presented in Table 2. With the exception of malondialdehyde, no interactions or main effects were noted for any lipid specific parameter ($P > 0.05$). A condition ($P < 0.0001$) and pre/post intervention ($P = 0.02$) effect was noted for malondialdehyde, with values lower for supplement compared to placebo and at pre intervention compared to post intervention, respectively. When comparing pre and post intervention values for the supplement, significant increases were noted in total cholesterol, HDL-C, and malondialdehyde ($P < 0.05$), while a decrease was noted in LDL-C:HDL-C and total cholesterol:HDL-C ($P < 0.05$). For placebo, significant increases were noted in HDL-C and malondialdehyde ($P < 0.05$), while a decrease was noted in LDL-C:HDL-C and total cholesterol:HDL-C ($P < 0.05$).

Complete blood count data are presented in Table 3. An interaction effect was noted for monocytes ($P = 0.04$). A condition effect was noted for MCH ($P = 0.01$), MCHC ($P = 0.03$), and neutrophils ($P = 0.02$). A pre/post intervention effect was noted for RBC ($P = 0.01$), MCV ($P < 0.0001$), MCH ($P = 0.002$), MCHC ($P = 0.001$), platelets ($P = 0.002$), neutrophils ($P = 0.01$), and monocytes ($P = 0.002$). No other interactions or main effects were noted for complete blood count data ($P > 0.05$).

Metabolic panel data are presented in Table 4. A condition effect was noted for glucose ($P = 0.02$), potassium ($P = 0.05$), and alkaline phosphatase ($P = 0.01$). A pre/post intervention effect was noted for CO_2 ($P = 0.0002$). No other interactions or main effects were noted for metabolic panel data ($P > 0.05$).

Appetite and dietary intake data are presented in Table 5. A pre/post intervention effect was noted for appetite ($P = 0.01$), with values lower post intervention compared to pre intervention. This was mostly influenced by the supplement condition; appetite was lower from pre to post intervention for supplement ($P = 0.0006$) but not for placebo ($P > 0.05$). No other interactions or main effects were noted for dietary data ($P > 0.05$).

Discussion

The findings from our investigation indicate that the dietary supplement OxyELITE Pro™ may assist in weight and body fat loss, while improving selected markers of the blood lipid panel. At a daily dosage of

Table 2. Lipid specific data for 32 men and women assigned to OxyELITE Pro™ or placebo for eight weeks.

Variable	OxyELITE Pro™			Placebo		
	Pre (n = 16)	Post (n = 16)	Pro™ *P* value**	Pre (n = 16)	Post (n = 16)	*P* value**
Cholesterol (mg·dL^{-1})	147.6 ± 5.0	156.0 ± 4.7	0.05	153.9 ± 4.3	158.4 ± 3.4	0.49
Triglycerides (mg·dL^{-1})	77.1 ± 9.3	62.6 ± 8.1	0.07	81.3 ± 8.1	87.3 ± 10.8	0.39
HDL-C (mg·dL^{-1})	50.0 ± 2.9	58.6 ± 3.7	<0.01	54.4 ± 3.0	58.3 ± 3.8	0.03
VLDL-C (mg·dL^{-1})	15.4 ± 1.8	12.6 ± 1.6	0.08	16.3 ± 1.6	17.5 ± 2.2	0.41
LDL-C (mg·dL^{-1})	82.6 ± 4.4	84.8 ± 4.1	0.50	83.2 ± 5.0	82.6 ± 3.3	0.44
LDL-C/HDL-C	1.8 ± 0.2	1.6 ± 0.2	0.04	1.6 ± 0.2	1.5 ± 0.1	<0.01
Total:HDL-C	3.1 ± 0.2	2.8 ± 0.2	<0.01	3.0 ± 0.2	2.9 ± 0.2	0.03
Malondialdehyde (μmol·L^{-1})*,†	0.52 ± 0.04	0.58 ± 0.04	0.04	0.85 ± 0.05	1.32 ± 0.20	0.02

Notes: Values are mean ± SEM. No condition × Pre/Post intervention interaction effects noted ($P > 0.05$); trend noted for malondialdehyde ($P = 0.07$). *Condition effect noted for malondialdehyde ($P < 0.0001$). No other condition effects noted ($P > 0.05$); †Pre/Post intervention effect noted for malondialdehyde ($P = 0.02$). No pre/post intervention effects noted ($P > 0.05$); ***P* values obtained using paired *t*-tests for each condition.

Table 3. Complete blood count data for 32 men and women assigned to OxyELITE Pro™ or placebo for eight weeks.

Variable	OxyELITE Pro™		Placebo	
	Pre (n = 16)	Post (n = 16)	Pre (n = 16)	Post (n = 16)
WBC ($10^3 \cdot \mu L^{-1}$)	6.4 ± 0.3	5.9 ± 0.5	6.2 ± 0.7	6.2 ± 0.4
RBC ($10^6 \cdot \mu L^{-1}$)†	4.7 ± 0.1	4.9 ± 0.1	4.5 ± 0.1	4.8 ± 0.1
Hemoglobin ($g \cdot dL^{-1}$)	14.1 ± 0.2	14.1 ± 0.3	14.1 ± 0.3	14.3 ± 0.3
Hematocrit (%)	41.9 ± 0.7	41.1 ± 1.0	41.4 ± 0.7	41.3 ± 0.9
MCV (fL)†	89.9 ± 1.2	84.3 ± 1.1	91.9 ± 1.2	86.6 ± 1.1
MCH (pg)*,†	30.3 ± 0.4	28.9 ± 0.5	31.3 ± 0.4	30.0 ± 0.4
MCHC ($g \cdot dL^{-1}$)*,†	33.6 ± 0.2	34.2 ± 0.1	34.0 ± 0.1	34.6 ± 0.2
RDW (%)	13.5 ± 0.3	13.2 ± 0.2	13.3 ± 0.2	13.0 ± 0.2
Platelets ($10^3 \cdot \mu L^{-1}$)†	183.8 ± 11.3	226.4 ± 17.8	208.4 ± 8.2	243.3 ± 8.0
Neutrophils (%)*,†	57.1 ± 2.5	48.8 ± 2.1	53.7 ± 2.9	49.9 ± 1.5
Lymphocytes (%)	33.2 ± 2.4	37.9 ± 2.3	34.8 ± 2.6	37.5 ± 1.6
Monocytes (%)**,†	6.5 ± 0.4	9.1 ± 0.6	8.1 ± 0.5	8.7 ± 0.4
Eosinophils (%)	2.9 ± 0.4	3.5 ± 0.6	2.9 ± 0.4	3.3 ± 0.6
Basophils (%)	0.4 ± 0.1	0.5 ± 0.1	0.4 ± 0.1	0.5 ± 0.1

Notes: Values are mean ± SEM. *Condition effect noted for MCH ($P = 0.01$), MCHC ($P = 0.03$), and neutrophils ($P = 0.02$); trend noted for MCV ($P = 0.07$) and platelets ($P = 0.09$). No other condition effects noted ($P > 0.05$); **Condition × Pre/Post interaction effect noted for monocytes ($P = 0.04$). No other condition × Pre/Post intervention interaction effects noted ($P > 0.05$); †Pre/Post intervention effect noted for RBC ($P = 0.01$), MCV ($P < 0.0001$), MCH ($P = 0.002$), MCHC ($P = 0.001$), platelets ($P = 0.002$), neutrophils ($P = 0.01$), and monocytes ($P = 0.002$). No other pre/post intervention effects noted ($P > 0.05$).

one to two capsules, the supplement does not result in any adverse effects pertaining to bloodborne markers of safety (eg, liver function). However, the supplement does result in an increase in resting heart rate of approximately six beats per minute. Although this increase in heart rate was not accompanied by a significant increase in systolic or diastolic blood pressure (~3 mmHg), it may be wise for hypertensive individuals to avoid use of this supplement, as any increase in these variables may be undesirable.

These data extend our prior work with this supplement. Using an acute laboratory study involving single ingestion of the supplement or placebo in a crossover design, we noted an increase in circulating free fatty acids and glycerol, as well as an increase in resting metabolic rate in men and women.[12] Using an open label design, we have also noted a reduction in appetite when subjects were treated with this supplement each day for 14 consecutive days.[13] Based on these results, we hypothesized that chronic use of the supplement might decrease appetite and overall food intake, while also stimulate metabolic rate and lipolysis—equating to body weight and fat reduction over time. Our collective findings indicate this to be the case; that is, when comparing pre and post intervention data for subjects in the supplement condition.

From an efficacy point of view, the variables with the greatest interest in this investigation are those presented in Table 1. In terms of anthropometric variables, although no interaction effects were noted, when values were compared for each condition independently from pre to post intervention, we noted significant changes in many variables. For example, body weight, waist circumference, skinfold thickness, and body fat percentage were decreased. However, it should be noted that a small portion of the body weight lost was fat free mass, a common finding in weight loss intervention studies.[15,16]

In terms of blood lipids, although no interaction effects were noted, when values were compared for each condition independently from pre to post intervention, we noted significant changes in many variables. First, malondialdehyde was increased from pre to post intervention in both conditions. This was surprising, as lipid peroxidation and oxidative stress are associated with levels of adiposity and an obese state.[17] We hypothesized that if the supplement was effective at inducing a weight loss, malondialdehyde would be lowered. To the contrary, malondialdehyde was increased slightly in the supplement condition from pre to post intervention despite the loss in body weight and body fat, and more so in the

Table 4. Metabolic panel data for 32 men and women assigned to OxyELITE Pro™ or placebo for eight weeks.

Variable	OxyELITE Pro™		Placebo	
	Pre (n = 16)	Post (n = 16)	Pre (n = 16)	Post (n = 16)
Glucose (mg·dL^{-1})*	87.8 ± 1.2	88.3 ± 1.6	85.4 ± 1.2	83.8 ± 2.1
BUN (mg·dL^{-1})	13.8 ± 1.0	14.6 ± 1.1	14.0 ± 1.2	15.3 ± 0.9
Creatinine (mg·dL^{-1})	1.0 ± 0.0	1.0 ± 0.1	1.0 ± 0.0	1.0 ± 0.0
BUN:creatinine	14.0 ± 1.0	14.4 ± 1.1	13.8 ± 1.0	15.8 ± 0.8
Sodium (mmol·L^{-1})	140.2 ± 0.6	139.9 ± 0.4	139.5 ± 0.7	140.1 ± 0.4
Potassium (mmol·L^{-1})*	4.3 ± 0.1	4.3 ± 0.1	4.4 ± 0.1	4.7 ± 0.1
Chloride (mmol·L^{-1})	103.4 ± 0.5	103.0 ± 0.5	103.1 ± 0.7	102.6 ± 0.5
CO_2 (mmol·L^{-1})†	24.6 ± 0.5	27.4 ± 0.5	24.6 ± 0.7	26.1 ± 0.4
Calcium (mg·dL^{-1})	9.4 ± 0.1	9.5 ± 0.1	9.3 ± 0.1	9.3 ± 0.1
Protein (g·dL^{-1})	6.9 ± 0.1	6.9 ± 0.1	6.7 ± 0.1	6.9 ± 0.1
Albumin (g·dL^{-1})	4.4 ± 0.1	4.4 ± 0.1	4.3 ± 0.1	4.4 ± 0.1
Globulin (g·dL^{-1})	2.5 ± 0.1	2.6 ± 0.1	2.4 ± 0.1	2.5 ± 0.1
A:G	1.8 ± 0.1	1.7 ± 0.1	1.7 ± 0.1	1.8 ± 0.0
Bilirubin (mg·dL^{-1})	0.5 ± 0.0	0.5 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
Alk Phos (IU·L^{-1})*	77.6 ± 5.8	73.8 ± 6.0	62.1 ± 5.4	60.8 ± 4.4
AST (SGOT) (IU·L^{-1})	24.3 ± 2.3	22.4 ± 1.9	23.9 ± 2.2	23.1 ± 2.6
ALT (SGPT) (IU·L^{-1})	20.9 ± 2.1	20.5 ± 2.2	19.6 ± 2.1	19.0 ± 1.5
GGT (IU·L^{-1})	17.9 ± 3.6	17.0 ± 2.0	13.4 ± 1.2	14.8 ± 1.0

Notes: Values are mean ± SEM. No condition × Pre/Post intervention interaction effects noted ($P > 0.05$). *Condition effect noted for glucose ($P = 0.02$), potassium ($P = 0.05$), and alkaline phosphatase ($P = 0.01$); trend noted for calcium ($P = 0.08$). No other condition effects noted ($P > 0.05$); †Pre/Post intervention effect noted for CO_2 ($P = 0.0002$). No other Pre/Post intervention effects noted ($P > 0.05$).

Table 5. Appetite and dietary intake for 32 men and women assigned to OxyELITE Pro™ or placebo before and during the final week of an eight week intervention.

Variable	OxyELITE Pro™		Placebo	
	Pre (n = 16)	Post (n = 16)	Pre (n = 16)	Post (n = 16)
Appetite (1–10 scale)†	6.3 ± 0.3	4.8 ± 0.5	6.0 ± 0.2	5.7 ± 0.2
Kilocalories	2359.0 ± 284.2	1930.0 ± 203.7	2419.5 ± 218.4	1964.8 ± 202.7
Protein (g)	99.6 ± 13.3	89.5 ± 9.7	106.5 ± 13.1	90.6 ± 10.3
Carbohydrate (g)	276.6 ± 28.9	229.1 ± 20.9	284.8 ± 32.7	241.2 ± 26.7
Fiber (g)	16.4 ± 1.4	16.5 ± 2.7	20.4 ± 3.0	15.1 ± 1.7
Sugar (g)	101.7 ± 14.1	77.9 ± 8.7	114.7 ± 19.8	99.1 ± 17.3
Fat (g)	70.1 ± 9.3	70.9 ± 10.6	89.2 ± 9.6	67.2 ± 8.4
Saturated fat (g)	22.4 ± 2.8	21.7 ± 2.8	28.0 ± 3.3	22.1 ± 3.0
Monounsaturated fat (g)	10.8 ± 1.7	12.3 ± 2.1	16.6 ± 3.7	13.2 ± 2.5
Polyunsaturated fat (g)	5.0 ± 0.8	6.1 ± 0.9	8.2 ± 1.6	5.4 ± 0.9
Trans fat (g)	0.9 ± 0.2	1.4 ± 0.5	1.5 ± 0.4	1.4 ± 0.4
Cholesterol (mg)	323.3 ± 54.3	365.9 ± 69.9	315.0 ± 62.0	306.5 ± 64.8
Vitamin C (mg)	63.9 ± 9.8	53.0 ± 11.0	79.2 ± 14.1	51.4 ± 9.0
Vitamin E (mg)	4.5 ± 2.2	5.1 ± 1.7	5.0 ± 1.8	3.8 ± 1.2
Vitamin A (RE)	369.7 ± 98.0	335.3 ± 77.5	265.5 ± 50.9	345.0 ± 73.2
Selenium (µg)	35.8 ± 6.4	52.1 ± 9.8	47.4 ± 7.9	59.7 ± 10.4

Notes: Values are mean ± SEM. No significant condition × Pre/Post intervention interaction effects noted ($P > 0.05$); trend noted for appetite ($P = 0.08$). No significant condition effects noted ($P > 0.05$); †Pre/Post intervention effect noted for appetite ($P = 0.01$); appetite lower from pre to post intervention for OxyELITE Pro™ (paired *t*-test; $P = 0.0006$); trend noted for kilocalories ($P = 0.06$); total kilocalories lower from pre to post intervention for placebo (paired *t*-test; $P = 0.004$); No other significant pre/post intervention effects noted ($P > 0.05$).

placebo condition. This may be at least partly due to the lowering of kilocalories from pre to post intervention (Table 5), a suggestion supported by recent work indicating an increase in malondialdehyde following caloric restriction in mice.[18] Aside from this, potential changes in subjects' activity profile during the days leading up the test days, coupled with the possibility of variation in sample processing and analysis may have contributed to the noted differences.

Second, total and HDL-C was increased in the supplement condition from pre to post intervention. Despite the increase in total cholesterol, the LDL-C:HDL-C and total cholesterol:HDL-C were lowered. Considering the benefits of HDL-C,[19] an improvement in this measure, and in particular the measures of LDL-C:HDL-C and total cholesterol:HDL-C, is welcome. This finding, coupled with the reduction in adiposity may suggest a cardioprotective effect of the supplement. It should be noted that a significant increase was also observed in HDL-C for the placebo condition, while a decrease was noted in LDL-C:HDL-C and total cholesterol:HDL-C. It is possible that these findings were due to changes in dietary intake over the course of the study (eg, reduction in kilocalorie intake). While no statistically significant interactions or main effects were noted for any dietary variables, total kilocalories were lower for placebo when comparing pre and post intervention data. A similar trend for lower kilocalorie intake was observed for the supplement condition, highlighting the possibility that overall dietary intake may have impacted the findings for serum lipids.

It should be understood that although subjects completed seven day food logs during the week before starting the intervention and during the final week of the intervention, they did not record all food and beverage consumed during the entire study period. While subjects were instructed to maintain their usual diet throughout the study period, it is possible that dietary intake varied over the course of the eight week intervention. Hence, either of the two weeks of collection may have underestimated or overestimated subjects' usual intake during their entire participation. This lack of control of dietary intake is indeed a limitation of our work, and of all similar human subject research.

The supplement tested in the present investigation contains six active ingredients (caffeine, bauhinia purpurea, bacopa monniera, geranium stem extract [1,3 dimethlyamlamine], cirsium oligophyllum, and rauwolscine extract), for which a detailed explanation of their potential mechanisms of action has been previously provided.[12] We cannot state with confidence which of these ingredients is chiefly responsible for the results obtained herein. We can simply state that the combination of these ingredients yields the results presented; which applies for all variables including anthropometric, bloodborne, and appetite.

One unique aspect of our study was our selected subject sample. That is, unlike most investigations using a dietary ingredient or whole food intervention in an attempt to induce weight loss, which typically include obese subjects exclusively (often who are sedentary), the present investigation used active individuals of whom 15 were normal weight (BMI 18.5–24.9 $kg \cdot m^{-2}$), 13 were overweight (BMI 25–29.9 $kg \cdot m^{-2}$), and 4 were obese (BMI $\geq$ 30 $kg \cdot m^{-2}$). Although we likely would have observed more robust changes in our outcome measures if we included obese subjects exclusively, we believe that our approach has much more application, in that our findings may have relevance to a large majority of individuals currently exercising with the desire to lose additional body weight and body fat.

With regards to our collected safety data, we noted an increase in resting heart rate of six beats per minute without a significant accompanying increase in systolic or diastolic blood pressure (although values for both blood pressure measures increased ~3 mmHg from pre to post intervention). Interestingly, we have noted a slight *decrease* in resting heart rate and blood pressure in a prior study of OxyELITE Pro™, when subjects ingested the supplement each day for two weeks.[13] Based on these conflicting findings, we are uncertain as to what the typical change in hemodynamic variables is following use of this supplement. The data for chronic caffeine intake (often delivered within coffee—at an amount equal to ~200–400 mg, or the equivalent of 2–4 cups) in relation to hemodynamic variables are mixed,[20] with some reports indicating a slight increase in these measures and others indicating no change or a slight decrease. Considering that other components are included within the tested dietary supplement besides caffeine, additional study would be necessary to either confirm or refute our initial work pertaining to the chronic effects of the supplement on hemodynamic variables. The small

increase in heart rate and blood pressure noted in the present study may be considered acceptable by some individuals, in particular those who are healthy with a low cardiovascular disease risk profile.

Regarding other bloodborne variables, we noted minimal change in all measured variables (Tables 3 and 4), with no interaction effects noted except for monocytes, which were higher post intervention for the supplement condition. Of particular importance concerning oral dietary supplements is the measure of liver enzymes. There was no increase noted in SGOT, SGPT, or GGT from pre to post intervention for the supplement condition. In fact, all values decreased slightly. Collectively, these findings indicate that eight weeks of intake of the dietary supplement at a dosage of one to two capsules per day does not cause any adverse outcomes in a sample of young and healthy men and women, with the exception of an increase in resting heart rate.

Conclusion

In conclusion, our findings indicate that the dietary supplement OxyELITE Pro™ may aid in weight and body fat loss in young, exercise-trained men and women. While the supplement does not adversely affect bloodborne markers of safety or increase resting blood pressure significantly, it does elevate resting heart rate. As the majority of subjects in this investigation were not obese, it is possible that supplementation with this agent could provide more robust effects in those with higher body weight and fat mass. Additional investigation is needed to confirm this hypothesis.

Competing Interests

RJB has received research funding or acted as consultant to nutraceutical and dietary supplement companies. Other authors declare no competing interests.

Author Contributions

CGM and REC coordinated the study and were responsible for data collection. RJA performed anthropometric measures and assisted with data collection. JPR performed DEXA scans. RJB was responsible for the study design, overseeing data collection, biochemical work, statistical analysis, and preparation of the manuscript. All authors reviewed and approved of the final manuscript.

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